

(No Model.)

2 Sheets—Sheet 1.

F. G. CORNING.

APPARATUS FOR TRANSFERRING ELECTRIC CAR BATTERIES.

No. 434,580.

Patented Aug. 19, 1890.

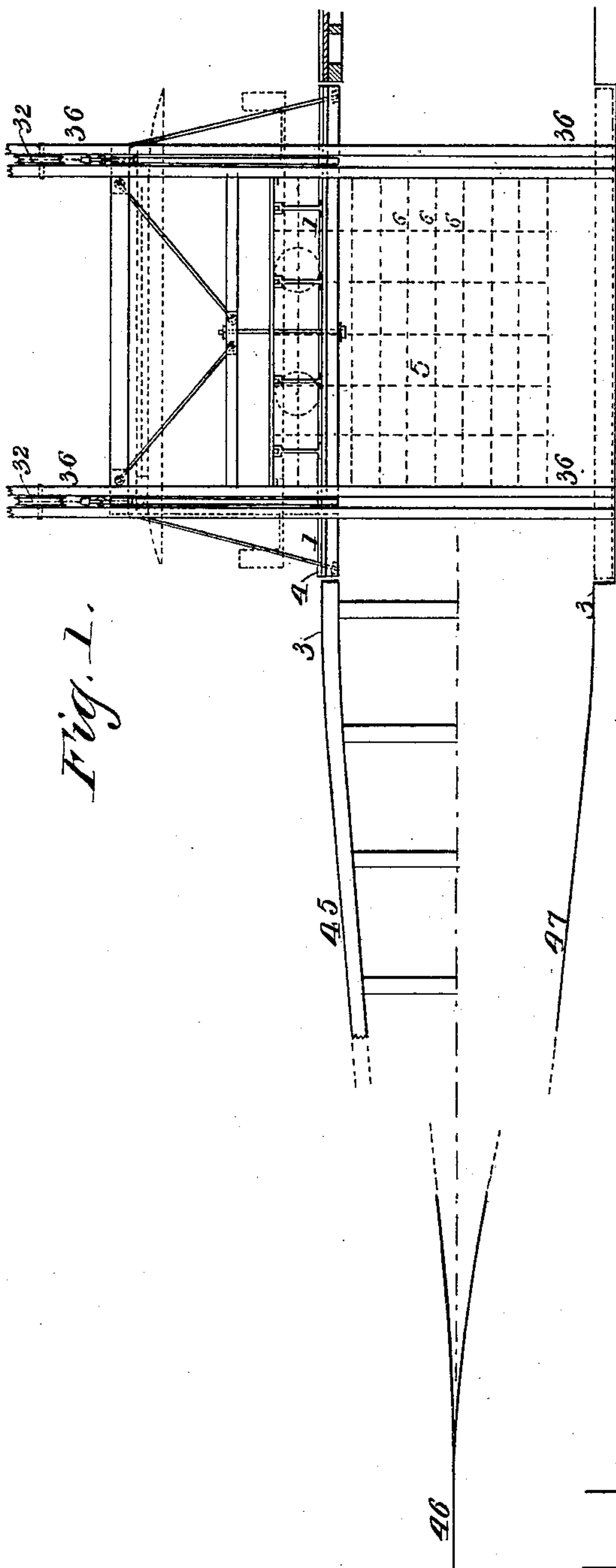


Fig. 1.

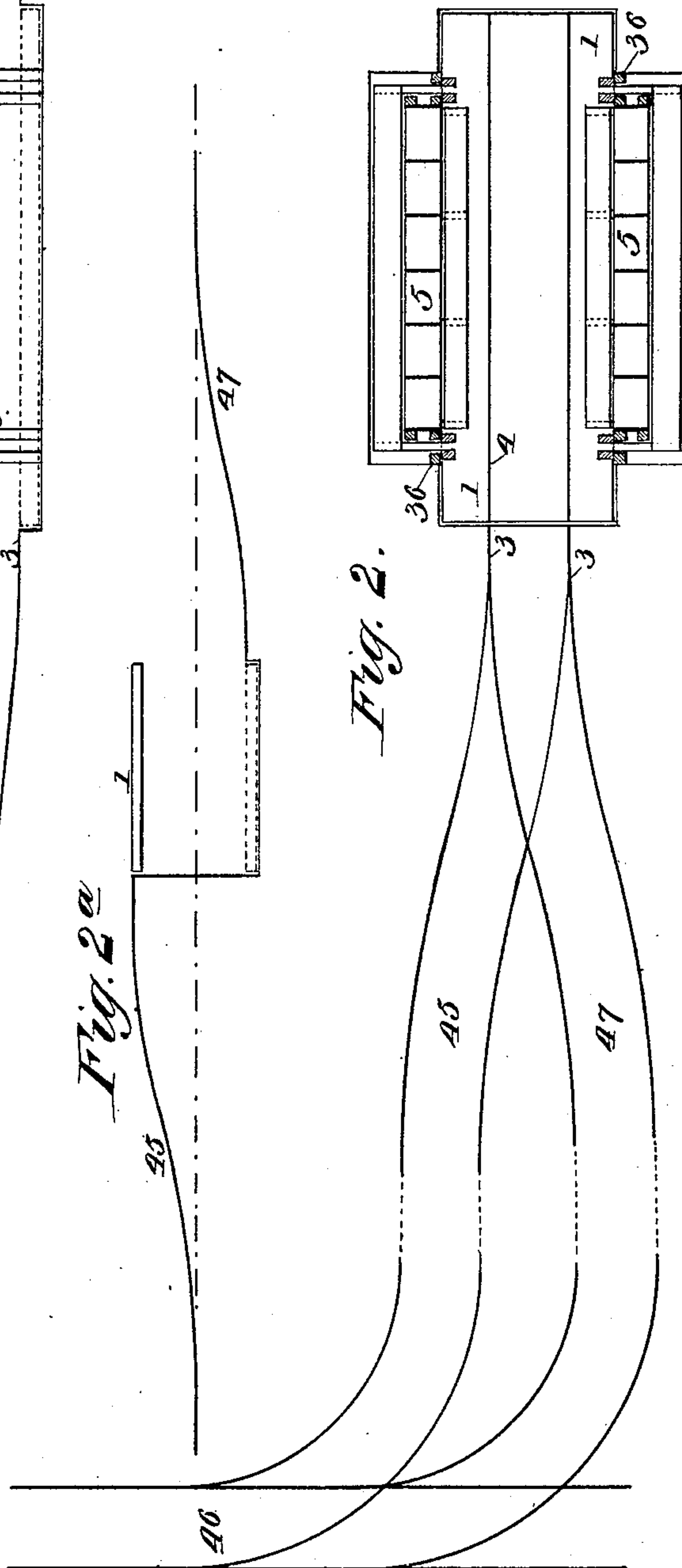


Fig. 2.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

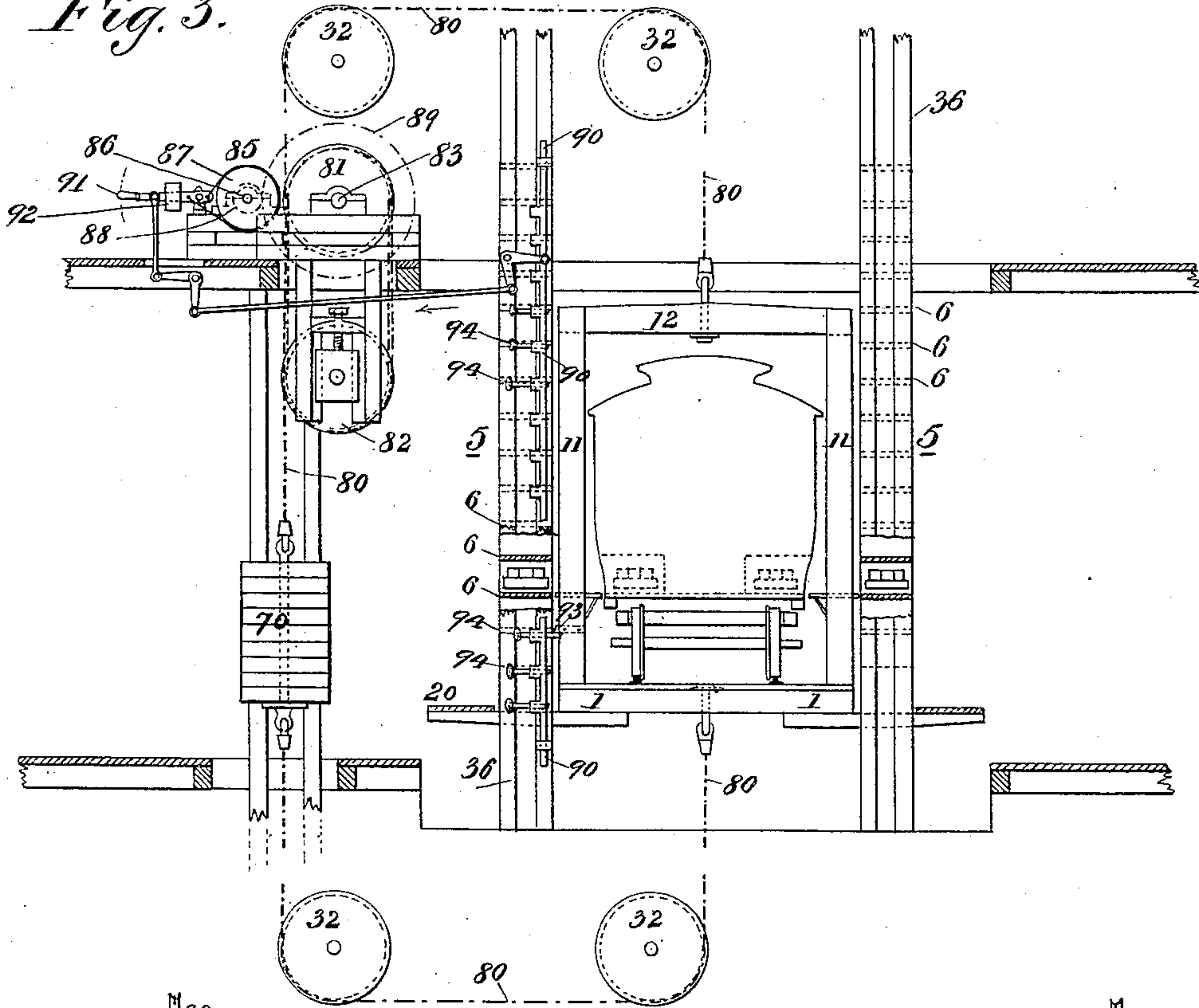


Fig. 4.

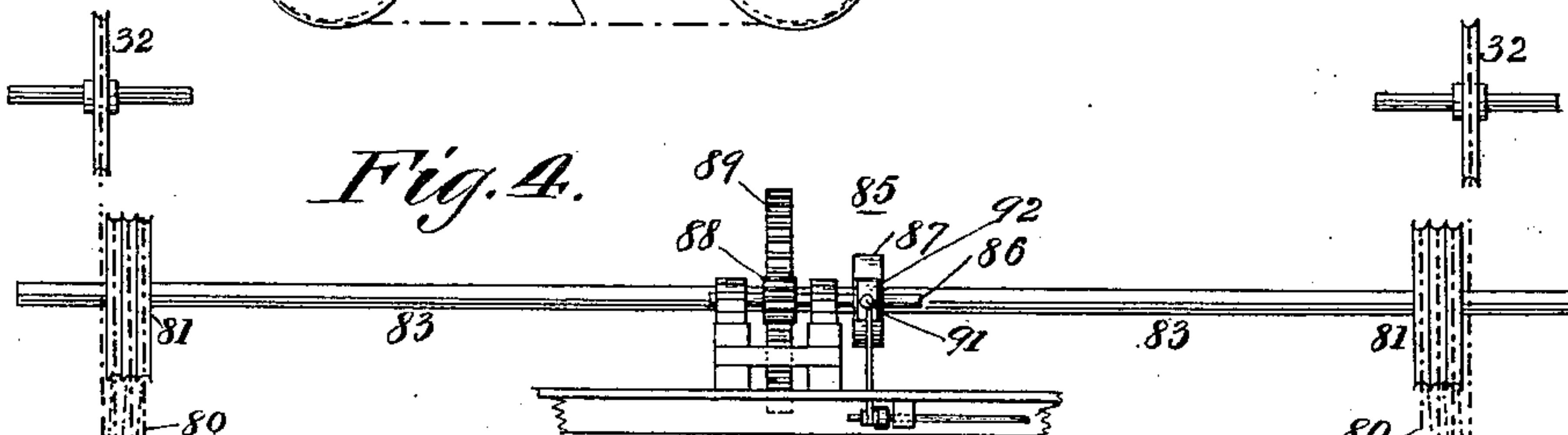
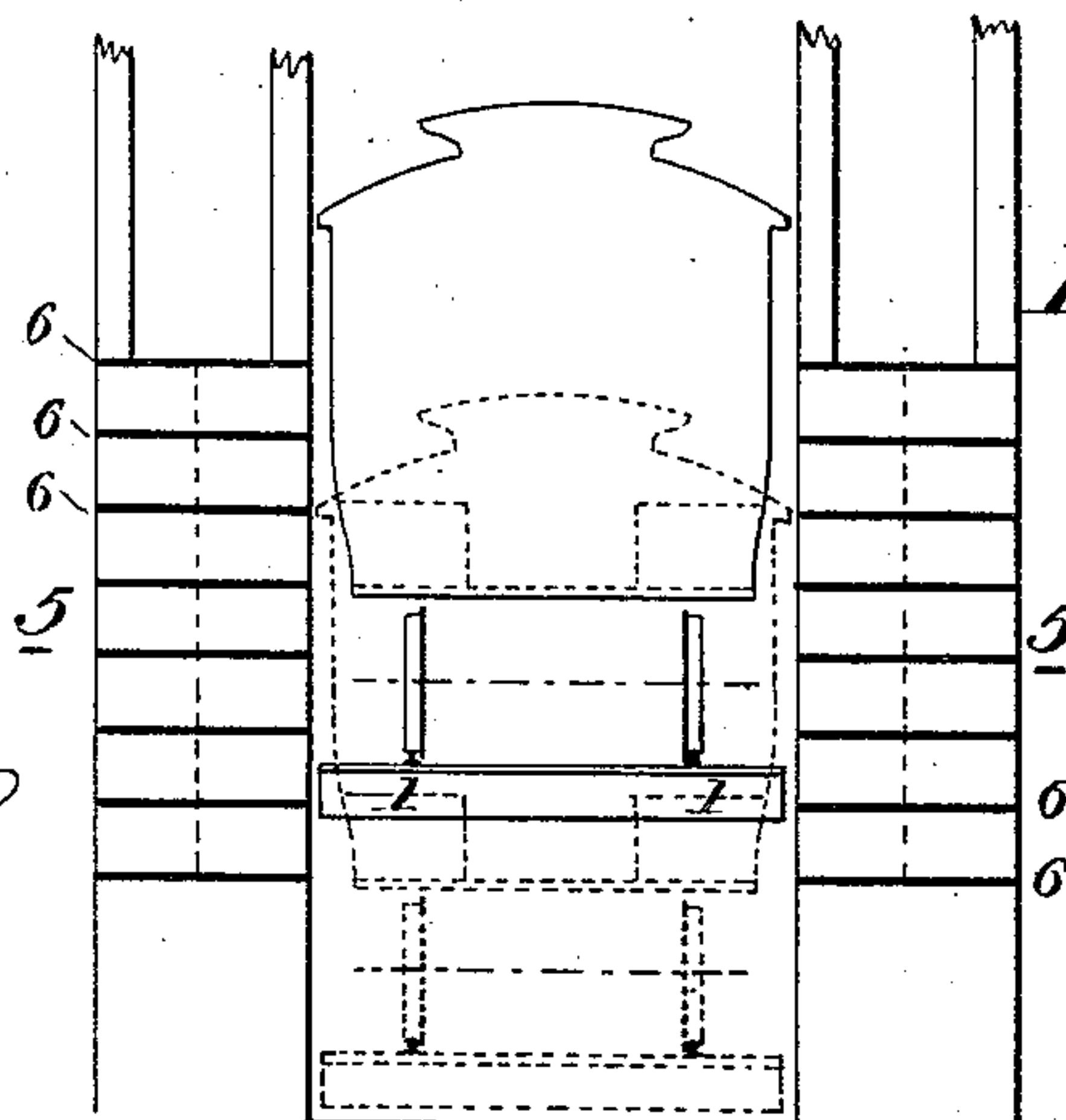


Fig. 5.



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APPARATUS FOR TRANSFERRING ELECTRIC-CAR BATTERIES.

SPECIFICATION forming part of Letters Patent No. 434,580, dated August 19, 1890.

Application filed May 31, 1890. Serial No. 353,808. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. CORNING, a citizen of the United States, residing at the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Transferring Electric-Car Batteries, of which the following is a specification, reference being had to the accompanying drawings, in which similar numerals of reference indicate corresponding parts throughout, and in which—

Figure 1 is a general side elevation illustrating my invention; Fig. 2, a plan view of Fig. 1, and Fig. 2^a a diagram of a modification relating to Fig. 2. Fig. 3 is an enlarged end elevation of the apparatus wherein the car is moved vertically, indicating the position of the battery-racks, and also illustrating one elementary form of mechanism suitable for regulating the vertical movement of the car; and Fig. 4 is a detail view showing in side elevation the said mechanism for regulating the vertical movement of the car. Fig. 5 is an end elevation representing diagrammatically, on a reduced scale, the use of double benches in the battery-racks in conjunction with my invention.

The invention herein relates to transferring "secondary batteries" or "accumulators" or other batteries from an electro-motive car to the recharging shelves or benches, wherein a large extent of charging-space is required to be condensed within a restricted horizontal limit, and wherein for the above purposes the car is transported to different levels upon a movable platform or section of car-track in proximity to a vertical series of such benches flanking the track, such as described and claimed by me in a separate patent, application filed May 21, 1890, Serial No. 352,638.

The object is primarily to elevate the car simultaneously with its movement from the street or "stand" into the stall of the charging-station, thereby saving time, and, secondarily, to utilize the motor on the car itself as the power to elevate it, and also to utilize the weight of the car to move it vertically to different levels opposite the battery-benches.

To these ends my invention consists in the combination, with a vertically-movable platform or section of car-track flanked by the battery-charging racks, wherein the batteries

are placed in vertical series, of an ascending grade or grades of track or inclined plane whereon the car is conveyed to an initial level and from a final level of the said movable platform or equivalent by the traction of its running-gear.

My invention also comprises means for effecting and controlling the vertical motion of the platform, whereby the same may be operated by power of gravity both in descending and ascending, and whereby the descent of the car may be arrested at will when its battery-receptacles are opposite any of the charging-benches.

1 in the several figures represents the movable platform, and 36 guideways therefor, the apparatus being substantially similar in leading features to that illustrated in my said separate patent application, and 5 5 represent the battery-racks flanking the movable platform and its path of movement, the benches 6 receiving the batteries in gangs or ranks, occupying thereby a minimum of horizontal space. Usual or suitable electrical connections are established in the racks, whereby each gang of batteries when they are received upon the benches 6 are included in the recharging-circuit. The closing of the circuit is automatically effected by suitable electrical contacts arranged upon the battery-trays connected to the poles of the batteries and corresponding electrical contacts in the benches, or when the battery-trays are shifted to the car by similar electrical contacts in the car-receptacles connected with the motor-circuit. Such electrical connections, having been heretofore fully described, will not require specific description here.

46 represents the normal or street level or location of the main line of track, and 45 47 the ascending grades, upon which the car is run by its own motor. The range of movement of the platform 1 is preferably from an initial position, which is above the normal level 46, to a final position below such level, whereby the energy of ascending the grades is divided between the approach and departure of the car from the stall and the required elevation attained within a minimum horizontal limit of travel for a given percentage of grade. At such initial and final positions of the platform 1 the tracks 4 thereon

coincide with the tracks 3 3 of the respective grades. The plan view, Fig. 2, indicates the essential arrangement of the tracks 3 in order to permit the passage of the cars where the two grades approach the main line at a substantially common point; otherwise should circumstances require, the approaching and departing grades 45 and 47, respectively, may be located in opposite or other directions with reference to the platform, as indicated in Fig. 2^a, lying in a common vertical plane or continuous line, as would appear in plan view.

In order to materially reduce the ascension required in proportion to a given storing capacity in the racks 5 5, I may employ benches of double horizontal capacity, reducing the vertical distance substantially one-half, as indicated in Fig. 5, such double benches being more fully described and claimed in my separate patent application, filed May 26, 1890, Serial No. 353,272. The percentage of the grade may thereby be correspondingly reduced, or, on the other hand, retaining a given percentage of grade, the same may be included in substantially half of the lineal distance required in conjunction with the single racks.

The mechanism for promoting the operation of the apparatus consists, elementarily, in a counterbalancing weight or weights 70, connected to the platform 1, said weights being of total gravity less than that of the platform and car combined, but exceeding that of the platform, whereby the descent is caused by the weight of the car and the ascent by the preponderance of the weights, also in a speed regulating and stopping mechanism for controlling the descent or ascent of the platform 1, the motion of the same being arrested opposite any of the benches by means of suitable brake or other mechanism, such as 85.

The counterbalancing-weights 70 may be connected in a variety of ways, as also the brake mechanism, which may be variously constructed according to methods well known to the art, and I do not therefore qualify my invention by any specific form of such auxiliary devices.

In Figs. 3 and 4, 11 11 represent the uprights of the platform-frame, and 12 the cross-beams above each end of the platform, the structure thus composed being guided in its vertical movement by the ways 36. In order to illustrate the apparatus in as simple a form as possible, I have shown single cables 80, having their ends connected directly and centrally to the platform structure at either end thereof. Each cable 80 is passed over sheaves 32, suitably located and continued in a coil about the tension-sheaves 81 82. Both the upper tension-sheaves 81 are located upon a common shaft 83, the sheaves 82 being adjustable apart from the sheaves 81, whereby tension of the cable is regulated, and a positive frictional purchase obtained through the sheaves 81 and shaft 83 during the descending or ascending motion of the car. The motion of descent of the car may thereby be ar-

rested at will by the brake 85, applied to a drum 87, which is shown upon a counter-shaft 86, geared by a pinion 88 and spur-gear 89 to the said shaft 83. A motor may be connected to the counter-shaft 86 for the purpose of elevating or moving the car independent of gravity in any contingency.

An automatic stopping device may be applied to the brake, whereby the position at which the platform shall stop in its descent may be predetermined. To illustrate this I represent in Fig. 3 a vertically-movable brake-rod 90, connected indirectly to the brake-lever 91, whereby to raise the latter in opposition to the weight 92 and apply the brake when the said rod 90 is thrust downward.

93 is a tripping-spur on the platform, and 94 movable stops in the rod 90, any of which may be projected into the path of the spur 93 at will preparatory to the descent of the platform. When the platform descends, the spur 93 will engage with any stop that shall have been projected, applying the brake and arresting the car when the battery-receptacles therein are exactly opposite a certain bench in the racks. When the batteries have been shifted, the stop 94 is withdrawn, releasing the weight 92, which releases the brake, permitting the continued descent of the car. The stops 94 are accessible to the operator on the platform 20. The brake may be applied at will by the operator at any level by direct agency of the rod 90.

In general operation the car is raised by its own electric motor ascending the grade 45. The platform 1 being in its elevated or initial position, (shown in Fig. 1,) the said car is run upon it. By means of the brake or other suitable retaining device the platform is kept in its initial position until the car has moved wholly upon it, or until it is desired to permit the act of descent. As soon as released the car and platform gravitate, preponderating the weights 70, and the speed of descent or the point or points of stoppage are determined at will by the brake mechanism or predetermined by the stops, such as described. After the batteries have been shifted from the car and charged ones substituted the descent is completed and the platform kept in its final position, (illustrated by dotted lines in Fig. 1,) while the car is run off by its own motor, ascending the grade 47 thence to the normal level or stand at 46. As soon as the car has left the platform 1 the latter is elevated by the weights 70 now preponderating, and regulated in its ascending speed again by the aforesaid brake, being arrested at its original position preparatory to a repetition of the operation.

In the use of single battery-benches—such as illustrated in Fig. 3—two stops are necessarily made during the descent of the car. In the use of double benches, as in Fig. 5, two stops are likewise made when such double benches are designed for the purpose of reducing vertical space. I may, however, em-

ploy the double benches in a series of similar height as those in Fig. 3, following the mode of operation described in said application, Serial No. 353,272, wherein but a single halt of the car is made between its initial and final positions.

In all cases the batteries are preferably interchanged in descending order of succession, utilizing gravity as the sole means of effecting the vertical movement, the car having ascended by its own motor in the manner described. The invention is, however, in no way limited to the gravity operation of the platform, the application of an elevating-motor to the platform mechanism having been heretofore clearly pointed out. Nor is my invention limited to the assignment of position of the grades shown with reference to the platform or elevator. The ascension may be accomplished wholly upon a single incline either during the approach or departure of the car to or from the stall, the remaining track being level, or the approaching track 45, upon which a "spent" car enters, may be of less incline than the other.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for transferring electric-car batteries, the combination, with a vertically-movable platform or section of car-track and a battery-charging rack or racks flanking the same, of an inclined track or plane or plurality of the same whereon the car is conveyed from one to another of different levels in the range of movement of said platform or equivalent.

2. In an apparatus for transferring electric-car batteries, the combination of a vertically-movable car-receiving platform or equivalent, battery-charging benches flanking the same, and graded car-tracks or inclined planes ex-

tending from a common level, respectively, to an initial and a final level in the range of movement of the said platform. 45

3. In an apparatus for transferring electric-car batteries, the combination of a gravity-actuated platform for the car, battery-charging benches flanking the same, and car-tracks or planes, one or both whereof are inclined from a normal level to the initial and final levels of the said platform, substantially as described. 50

4. The combination, with the charging-benches, the ascending grades, and the gravity-platform opposite the benches, of the counter-weights connected to the platform by cables or otherwise to preponderate the same, but being of less gravity than the platform and car combined, for the purpose set forth. 60

5. The combination, with the charging-benches, the ascending grades, and the gravity-platform opposite the benches, of mechanism for controlling or arresting the descent of the platform at will. 65

6. The combination, with the charging-benches, the ascending grades, the gravity-platform, and the counter-weights exerting a degree of force medial to that exerted by the loaded or unloaded platform, of mechanism for controlling or arresting the vertical motions of the platform. 70

7. The combination, with the charging-benches, the ascending grades, the gravity-platform opposite the benches, and the brake mechanism for arresting the descent of the platform, of mechanism, substantially as described, for applying the said brake automatically at a predetermined period in the descent of the car. 75

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Witnesses:

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